

Patent Claims

1. A method for determination of oscillations on a rotating blade disc (22) of a turbine (10), having the following steps:  
5 provision of a substance (28) which emits light quanta by external excitation at at least one point on the blade disc (22),  
transmission of radiation by means of a radiation source (30)  
10 at the rotating blade disc (22) and at the substance (28) which is arranged on it, in order to externally excite it,  
determination of light quanta emitted from the substance (28),  
by means of a sensor (38), and evaluation of the signal from  
the sensor (38) in order to determine the oscillation behavior  
15 of the blade disc (22).
2. The method as claimed in claim 1,  
characterized by the following steps:  
provision of the substance (28) which emits light quanta on at  
20 least one circumferential, essentially closed, covering strip  
structure (26) on the blade disc (22), and  
evaluation of the signal from the sensor (38) in order to  
determine the oscillation behavior of the covering strip  
structure (26).  
25
3. The method as claimed in claim 1 or 2,  
characterized by the following steps:  
provision of the substance (28) which emits light quanta on at  
least one revolving turbine blade (24) on the blade disc (22),  
30 and  
evaluation of the signal from the sensor (38) in order to  
determine the oscillation behavior of the at least one turbine  
blade (24).

4. The method as claimed in one of claims 1 to 3,  
characterized

5 in that the substance (28) which emits light quanta is applied  
in the form of a strip to the blade disc (22), to the covering  
strip structure (26) and to the at least one turbine blade  
(24).

10 5. The method as claimed in one of claims 1 to 4,  
characterized

15 in that a fluorescent, a phosphorescent, a radioluminescent, a  
thermoluminescent, a triboluminescent and/or a photoluminescent  
substance is applied to the blade disc (22) as the substance  
(28) which emits light quanta, and an appropriately sensitive  
sensor (38) is used in order to determine emitted light quanta.

20 6. The method as claimed in one of claims 1 to 5,  
characterized

in that an optical filter (40) is arranged between the blade  
disc (22) and the sensor (28).

25 7. The method as claimed in one of claims 1 to 6,  
characterized

in that the signal from the sensor (38) is amplified before its  
evaluation, in particular by means of at least one photodiode  
or a photomultiplier.

30 8. An apparatus for determination of oscillations on a  
rotating blade disc (22) of a turbine (10), having  
at least one point on the blade disc at which a substance (28)  
which emits light quanta as a result of external excitation is  
arranged,

a radiation source (30) by means of which radiation can be transmitted to the rotating blade disc (22) and to the substance (28) arranged on it, for external excitation,  
a sensor (38) for determination of light quanta which are  
5 emitted from the externally excited substance (28), and an evaluation circuit (48) for evaluation of the signal from the sensor (38) and for determination of the oscillation behavior of the blade disc (22).

10 9. The apparatus as claimed in claim 8,  
characterized  
in that the substance (28) which emits light quanta is applied  
to at least one revolving, essentially closed, covering strip  
structure (26) on the blade disc (22), and  
15 the signal from the sensor (38) can be evaluated in order to  
determine the oscillation behavior of the covering strip  
structure (26).

10. The apparatus as claimed in claim 8 or 9,  
20 characterized  
in that the substance (28) which emits light quanta is applied  
to at least one revolving turbine blade (24) on the blade disc  
(22), and  
the signal from the sensor (38) can be evaluated in order to  
25 determine the oscillation behavior of the at least one turbine  
blade (24).

11. The apparatus as claimed in one of claims 8 to 10,  
characterized  
30 in that the substance (28) which emits light quanta is applied  
in the form of a strip to the blade disc (22),

to the covering strip structure (26) and to the at least one turbine blade (24).

12. The apparatus as claimed in one of claims 8 to 11,

5 characterized

in that the substance (28) which emits light quanta is a fluorescent, a phosphorescent, a radio luminescent, a thermoluminescent, a triboluminescent and/or a photoluminescent substance, and the sensor (38) is an appropriately sensitive 10 sensor (38) in order to determine emitted light quanta.

13. The apparatus as claimed in one of claims 8 to 12,

characterized

in that an optical filter (40) is arranged between the blade 15 disc (22) and the sensor (38).

14. The apparatus as claimed in one of claims 8 to 13,

characterized

in that an amplifier circuit (46) is provided for amplification 20 of the signal from the sensor (38) before its evaluation, in particular in the form of a photodiode or a photomultiplier.